UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,206	06/06/2001	James Francis Crossland	BLD920010002	1287

30400 7590 02/07/2005

HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 COLUMBIA CIRCLE
ALBANY, NY 12203

EXAMINER	
LEE, TOMMY D	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/876,206	CROSSLAND ET AL.	
	Examiner	Art Unit	
	Thomas D. Lee	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-35 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-35 is/are rejected.

7)☐ Claim(s) _ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 20010606.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Each of independent claims 1, 11, 16, 23, 28-30 and 35 recite a *maximum* number of densities per basic cell being greater than (1 + nx(L-1)) for *a constant input intensity*. While the examiner understands what the applicant is attempting to claim, this limitation, as specifically worded, is not disclosed in applicant's specification. Noting, for example, applicant's Fig. 14, while the total number of densities per basic cell (20) is greater than (1 + nx(L -1)) = 10 (where n (number of pels in a basic cell) is 9 and L (number of output intensity levels) is 2), the *maximum* number of densities per basic cell *for any given input intensity* is four (for an input intensity of 4, four different output densities, numbered "6" through "9," are shown for the "invention example"), which is less than 10.

4. Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 23 recites a single means for allowing different placements of a same number of output dots within a basic cell to create different average densities for said basic cell. A single means claim, i.e., where a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. *In re Hyatt,* 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.). When claims depend on a recited property, a fact situation comparable to *Hyatt* is possible, where the claim covers every conceivable structure (means) for achieving the stated property (result) while the specification discloses at most only those known to the inventor. See MPEP 2164.08(a).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 11, 12, 16-18, 23, 24, 28, 30-32 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,805,305 (Abe).

Regarding claims 1-3, Abe discloses a method of halftoning comprising: receiving input data comprising a first plurality of pels having a first plurality of intensities, wherein said first plurality of intensities (Iin) are chosen from K intensity values (multi-level image data supplied to dither converter (column 3, lines 22-35)); converting the first plurality of pels having said first plurality of intensities into a second plurality of pels having a second plurality of intensities, wherein said second plurality of intensities (Iout) are chosen from L intensity levels, where L < K (image conversion circuit converts multi-level image data to binary image data (L=2) (column 3, lines 36-49)); wherein at least some pels of said second plurality of pels are grouped into at least one basic cell each basic cell comprising n pels of said second plurality of pels (binary image data made up of dither patterns comprising 9 pixels (n=9) (column 3, lines 50-63; Fig. 5)); and wherein a total number of densities per each basic cell is greater than (1 + nx(L-1)) for a constant input intensity (Iin), and each said intensity out (Iout) is chosen without reference to an intensity out of a neighboring pel and multiple pels of the first plurality of pels contribute to the density of each basic cell (number of dither patterns, each corresponding to a different density level, is 20 (column 4, lines 11-25; Fig. 5), which is greater than 1 + (9x(2-1)) = 10; error diffusion not required (column 6, lines 30-35), and thus output levels chosen without reference to neighboring pixels; 9 pixels contribute to density of each dither pattern (Fig. 5)). The method further comprises employing said second plurality of intensities (Iout) to place dots within each basic cell,

wherein adjacent dots overlap within said basic cell (hem of Gaussian distribution profile protrudes into adjacent pixels (column 6, lines 4-16; Fig. 10)); and producing said dots using a bilevel output device, wherein L=2 (electrophotographic image forming unit (column 3, lines 64-67)).

Regarding claims 11 and 12, Abe discloses a method of halftoning comprising: allowing different placements of a same number of output dots within a basic cell to create different average densities for said basic cell, wherein adjacent output dots overlap within said basic cell, and wherein for a constant input intensity of input data and a given number of pels (n) per basic cell a number of average densities per basic cell is greater than 1 + nx(L-1), where L is a number of intensity levels from which an output intensity (Iout) of each pel of the basic cell is chosen (column 4, lines 11-25; column 6, lines 4-16; Fig. 5, 10); and wherein each said intensity out (Iout) is chosen without reference to an output intensity of a neighboring pel, and multiple input pels of said input data contribute to the average density of each basic cell (column 6, lines 30-35; Fig. 5). The method further comprises producing said output dots using a bilevel output device, wherein L=2 (column 3, lines 64-67).

Claims 16-18, 23 and 24 are system claims corresponding to above-rejected method claims 1-3, 11 and 12, respectively. Claims 28 and 29 are apparatus claims corresponding to method claims 1 and 11, respectively. The means or at least one computing unit for performing the method steps are disclosed in Abe, as set forth above.

Claims 30-32 and 35 recite a machine-readable medium storing data representing sequences of instructions, which cause a processor to perform the steps previously recited in above-rejected method claims 1-3 and 11, respectively. This limitation is disclosed in Abe (ROM stores control program, CPU performs dither image conversion (column 5, lines 47-61).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 4-7, 13-15, 19-21, 25-27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of U.S. Patent 4,672,432 (Sakurada et al.).

Regarding claims 4 and 13, Abe does not disclose producing said dots using a multilevel output device, where L>2. However, Sakurada et al. disclose a method

whereby the number of output levels for each color of an output image is 3 (no density, low density and high density (column 2, line 17 – column 3, line 2; Fig. 1); further note 34 possible output density levels, which is greater than 1 + 9x(3-1) = 19 (Fig. 1)). One of ordinary skill in the art would have recognized in view of Sakurada et al. that providing a greater number of output levels effectively increased the reproduction range of an output device, thereby enhancing the tonal quality of an output image. Therefore, it would have been obvious for one of ordinary skill in the art to modify the teaching of Abe by performing conversion of image data to more than two output levels, as disclosed in Sakurada et al.

Regarding claims 5-7, 14 and 15, Abe does not disclose producing said dots using a color output device, and wherein a subset of said second plurality of pels comprises one of multiple color components. However, the method disclosed in Sakurada et al. provides for the reproduction of image data using black, yellow, magenta and cyan inks (column 3, lines 26-34). As color image reproduction is prevalent in the market today, one of ordinary skill in the art would have been motivated to provide color reproduction capability, such as disclosed in Sakurada et al., to the teaching of Abe, so that a greater number of output density levels for each color of a color image may be realized.. Further regarding claims 6, 7 and 15, whether the number of output levels is 2 (as disclosed in Abe) or greater than 2 (as disclosed in Sakurada et al.) depends on the output capability of a printer, and either one may obviously be chosen according to a maker's preference. All such devices are inherently either bilevel or multilevel.

Claims 19-21, 25-27 and 33 recite the limitations of above-rejected claims 4-7 and 13-15. The means for performing the method steps are suggested by Abe in view of Sakurada et al., as set forth above.

10. Claims 5, 6, 14, 15, 20, 21, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of U.S. Patent 4,897,736 (Sugino).

Regarding claims 5, 6, 14 and 15, Abe does not disclose producing said dots using a color output device, and wherein a subset of said second plurality of pels comprises one of multiple color components. However, the method disclosed in Sugino provides for the reproduction of image data (16 possible output density levels, which is greater than 1 + 8x(2-1) = 9 (Fig. 3A and 3B)) using plural colors (column 2, lines 57-63). As color image reproduction is prevalent in the market today, one of ordinary skill in the art would have been motivated to provide color reproduction capability, such as disclosed in Sugino, to the teaching of Abe, so that a greater number of output density levels for each color of a color image may be realized. Further regarding claims 6 and 15, the number of output levels in both Abe and Sugino is 2 (bilevel).

Claims 20, 21, 26 and 27 recite the limitations of above-rejected claims 5, 6, 14 and 15. The means for performing the method steps are suggested by Abe in view of Sugino, as set forth above.

Allowable Subject Matter

11. Claims 8-10, 22 and 34 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to disclose or suggest point-wise thresholding using multiple threshold matrices to convert said first plurality of pels into said second plurality of pels without considering a neighboring pel, as recited in claims 8, 22 and 34, in combination with the conversion of pels as recited in corresponding base claims 1, 16 and 30.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas D. Lee
Primary Examiner
Art Unit 2624

tdl
February 3, 2005